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TITLE

CUTION TEST OF HIGH PRESSURE REGIST VIL

3200 LID 6500 2310

This spec

SUBMITTED UNDER

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DDC CCT 28 1866

MISSILE SYSTEMS DIVISION VAN NUYS, CALIFORNIA

REPORT NO. 1330/503016 DATED 08630 17, 1950

#### LOCKHEED AIRCRAFT CORPORATION

MISSILE SYSTEMS D.VISION VAN NUYS, CALIFORNIA



#### TITLE

EVALUATION TEST OF HIGH PRESSURE RELIEF VALVES

3200 AND \$500 PSIO

SUBMITTED UNDER

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#### OBJECTIVE

The purpose of this test was to evaluate and compare several high pressure relief valves from various manufacturers in order to determine which parts were acceptable for helium service and weapon system usage.

#### COCCLUSION

None of the valves satisfied all of the test specifications principally because of leakage and/or poor functional performance at 160°F or 0°F (valve budy temperatures). However, the valves from two manufacturers, namely Fluid Mechanics and Anderson Greenwood and Co., were superior in correrison to the other valves which were tested.

#### SUMMARY

It was originally intended that each valve be subjected to functional performance tests before, during, and after temperature, cycle, vibration, shock and corrosion tests. However, all of the valves were satisfive to temperature to some degree and either leaked and/or changed set pressure at 160°F or 0°F (valve body temperature). Therefore, most of the test time was devoted to repairing and/or readjusting each valve and repeating the temperature tests in an effort to correct the temperature deficiencies. Consequently, all valves were subjected to the temperature test, four were subjected to the cycle test, one was subjected to the vibration test, and none were subjected to shock or corrosion tests.

#### TEST SPECIMENS

The test specimens were high pressure relief valves supplied by five manufacturers. The valves were identified as indicated in Table I.

TABLE I. TEST SPECIMENS

MANUFACTURER AND LOCATION	PART NUMBER	SERIAL HOMBER	SE! PRESSURE	SYAT MATERIAL
Anderson Greenwood and Co. Houston, Texas	3JS46-4 3JS46-3	1180 1179	3200 6500	Build-N of Viton-A
Fluid Mechanics Houston, Texas	44-TG-8-SP 44-TG-8-SP	498 -497	3500 6500	Kel-F, Hylon or Tellon
W.R. Ladewig Go. Los Angeles, California	1548 1548 1548	B59 C59 G59	3200 3200 3200	Kol-F
Vacco Valve Co. Los Angeles, California	RV90-4P-403		3200	Nylon
Vinson Manufacturing Co. Van Nuys, California	A-80040 A-90157-1 A-90157-2	1003 1001 1002	3200 3200 6500	Kel-F and Buns-N or Viton-A

Photographs of the test specimens are presented in Figures 1 through 5.

These valves are intended to be used as safety relief valves to protect appropriate ground service equipment (such as the mobile high presoure helium gas supply system) from over pressure resulting from thornal expansion of the compressed gas or failure of regulators or shut-off valves. It was considered desirable to procure relief valves with minimum differential between cracking and reseating pressures in order to rimine gas loss due to blow-down action.

Referring again to Table I, those valves with Teflen, Kel-F or Viton-A seals should be satisfactory in applications where occasional exposure to IRFNA fumes is unavoidable whereas the valves with Bunn-N or mylen seals would be unsatisfactory unless adequately protected from such fumes.

The following opecifications are reproduced from the references.

TABLE II. PELIEF VALVE SPECIFICATIONS

	Valve Set Preasure (PSIO)	Proof Pressure (PSIG)	Gracking Pressure (PSIO)	Reseating Pressure (PSIO);
1	3200	4,500 \$ 100	3200 ± 25	3100 Min.
7	6500	10,000 2 100	6500 ± 100	6300 Min.

- b. Zero leakage is required up to 90% of cracking pressure.
- c. Zero leakage is required below the minimum reseat pressure.

#### TEST POULFMENT AND INSTRUMENTATION

The following equipment and instrumentation were utilised during these tests.

- 1. Regulated holium supply system.
- 2. Grieve-Hendry oven, +100 to +550°F.
- 3. Temperature chamber, -40 to +40°F (fabricated at IESD for this test).
- 4. Calidyne shaker, 5000 force pounds (LMSD 20457).
- 5. Calidyna shaker control console (IMSD 24508).
- 6. Miscellancous pressure gages, valves, fittings, etc.

#### DEFINITIONS

- 1. A functional performance test consisted of several actuation cycles performed in succession (usually 10 actuation cycles).
- 2. An actuation cycle consisted of the following:
  - The inlet pressure to the specimen was increased until the first indication of continuous flow, of any magnitude, through the specimen was observed. This was recorded as cracking pressure.

Compared to the control of the contr

b. The inlet proceure was then increased slightly so that rapid flow through the specimen was achieved for approximately one second.

- o. The inlet process was then reduced until flow through the specimes coased entirely (sero leakage). This was recorded as rescating processes.
- d. The inlet preseure was then reduced to working preseure (3000 or 6000 paig) or at least 100 pai below recent preseure.

#### hispier gaters of which

#### PROCEDURE

followed in order during the test program. All speciesses were improved (Section I) and subjected to Temperature Test #1 (Section II). Only those speciesses which functioned preparity at roos temperature after completion of Temperature Test #1 were subjected to the remainder of the test program. Any speciesses which collimated during the temperature test were repaired and/or reverses by USD or the name actuary and then retested. Helium gas used for all tests where pressure was applied.

#### I. Inspection

Each specimen was vicually inspected for evidence of damage, defects and contaminants. The specimens were not disconsibled for this inspection.

#### II. Temperature foot Al

Their specimen was functionally teamed at each of the following stabilised walve body temperatures in the order listed.

- 6. Reca temperaturo
- b. 160°7
- e. Resa temperature
- d. OP

#### III. Cyclo Took #1

\$4164 A\*\*\* CF# \*

The specimens which functioned entisfactorily after completion of the temperature test were subjected to a cycle test consisting of 500<sup>1</sup> actuation cycles performed in succession at room temperature. Gracing and recenting processes were recorded faring each cycle.

<sup>1.</sup> T.A. 3069 originally specified 500 cycles and was later reduced to 50 cycles.

#### IV. Teaperature Test #2

The temperature test was repeated exactly as described in Section II.

#### V. Vibration Test

The 3200 paig Andorson Oreomscod relief valve are subjected to vibration of 5 to 20 ops at 0.4 inch double amplitude and 20 to 2000 ops at 10 g.

Vibration was applied (1) parallel to the axis of the poppet and opsize, and (2) perpendicular to the axis of the poppet and opsize, Inlet process to the valve was maintained at 3000 paig and leakage from the outlet port was menitored during vibration. The frequencies at which leakage occurred were recorded.

#### VI. Cycle Test #2

A second cycle test of 500° setuntion cycles was then executed at roca temperature. Creeking and rescating pressures were recorded during each cycle.

#### VII. Temperature Tost #3

A final temperature test was then accomplished as described in Section II.

#### results

The results of the tests described above are presented in the following tabulation. An asterick appended to a cracking proscure value in the following text indicates "pop" pressure, i.e., approximate wide spea pressure.

SERIAL NUMBER 10.00 CO., 1700 PETO RELIEF VALVE, 1795 3 FERO-RESERVANCES

## I. IESPECTION RESULT: Figual inspection of this value revealed no evidence of external damage, defects and contaminants.

#### II. TEMPERATURE TEST RESULTS

TESS CONDITION	CRACKING PRESSURE	RESEATING PRESSURE	TEST CONDITION	CRACKI TO PRESSURE	RESEATING PRESSURE
	(pair)	(peig)		(rsig)	(psig)
Le. Boon tempor-	3090	3050	I.c. Locs tem-	7062	
ethra operation	3090	Looked	perature oper-	3050	3030
(TOY) as received.	3080	2900	ation (70°F).	3050	3030
	3080 -	3050	(Valve stabi-	3050	3030
Negative Section 1	3060	30k0	lised at rees	3050	3040
	3070	30k0	temperature	<b>3050</b>	3040
	3070	3050	after expenses	3050	30LO
	3070	3050	at 160°7.)	3050	3030
	3060	3050		3050	3030
	3070	3050		3050	3030
	3050	3050		30LC*	3000
	3070	3050		304C×	3020
Marie Marie	3080#	2900		30L0*	3010
	3060*	3050	# D		
			1		
A.b. Operation at	3050	2990	I.d. Operation	Valve le	and expess-
160°F. (The valve	3060	303.0	at O F. (The		100 paig.
was heated to 160°	3060	3020	valve was ocoled		
in a temperature	3040	3020	te O F in a tem-		
chamber and then re		3010	perature chamber	3	
moved and tested	3060	3030	end then removed	•	
immediately.)	3040	3020	and tested im-	Ī	
	3030	3050	mediately.)		,
NA VACAN	3030	3020			
, which was the state of the st	3030	3010			
	3030	3020		İ	
e de la companya de l	3000*	2700			
1		* * "			
į į	70104		• •	,	
	3010*	2930		į	
Berrings were	3010#	2890	Care of Care o		
	3010# 3010#	2890 2970			
	3010#	2890	The Control of Control	a pa ef contraggillaren estanatur esta	

<sup>2.</sup> Valve leaked excessively, therefore it was disassembled and inspected. Approximately 8 timy steel chips were found on the poppet 0-ring seal. The valve was cleaned and ressembled and testing was continued.

MOTE: Helium gas was used for all test.

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Indicates "pop" pressure (approximate wide open pressure).

CONTROL CREWWOOD AND CONTANT, 3200 PRIE CALLES VALVE, TYPE NICE-L.

· · · · · · · · · · · · · · · · · · ·	8 '	TII.	CICLE-TES	2 EDMLAS	* ************************************		*
GRAPH I	i Lista ettes		ECONT IN	<b>ELECT</b>	ABSATINO	CALCE DEG	BASSEATING
		PRINTERS.	PERSONA	MAN TO	PRESSURE	Parssure	PRESSUES
(pefg)	(pais)	(peste)	(peig)		(peig)	(peig)	(poig)
3000 mode	SOIS pole	9050 pele	3000 peig	The same of	3000 pela	3050 paid	3000 pais
30 <b>2</b> 0	000	3050	2000	30	3000	3050	3000
30.50	20.37	3050	3000			3050	3000
3050	22	3050	3000	7044	2000	变	3000
9050	29(2)	7030	3000	100		<b>305</b> 0	3000
30 <b>5</b> 0	24.2	303	3000	文件:	3000	3090	3000
3050	25 6	30500	3000	3058	3000	3050	3000
3050	29 1	<b>305</b>	3000	<b>302)</b>	<b>30</b> 00	3050	3000
<b>3050</b>	29	3050	3000	309	漢00	3050	3000
3050	29	<b>3050</b>	3000	3090	2550	<b>3090</b>	3090
.050	5 <b>9(0)</b>	3050 3050	3000	<b>30</b>	2650	3090	3000
3050	29 <b>9</b> 0	1050	3000	20里	2000	3050	\$000
3050	2970	3038	2750		350C	3050	3000
3050	2990 .	3050	2770	De la		3050	3000
5050	2990	3050	, <b>3000</b>	<b>200</b> ,		3050	3000
3050	2930	3050	3000	30E		3050	3000
20%0	2990	222	3000	700	200	3050	3000
3050	2990	30,00	3000	300	3000	3050	3000 3000
3050	3000	3050	2990	7.70	1000	3050 3050	3000
30,20	2000	3090	2590	3050	2000	3050	3000
3050	3000	3050	2990	3050	2000 2000	2000	3000
3050	3000	3050	3000	3050	3800	3050 3050	3000
3050	3000	3090	3000	3050	3000	3096	2950
3050	29 <b>30</b> 29 <b>30</b>	3050	3000	3050	3000	3050	2990
<b>3050</b>	3000	3050	3000	3050	3000	3050	2990
3050	3000	3050	3000	3050	3000	3090	2970
3050 2050	3000	3050	3000 3000	3090 3090	3000	3050	3000
3050	2000	3050 3050	3000	3050	3000	3050	3000
9050 9050	3000	3050	3000	3050	3000	3050	3000
3050 3050	2000	3050	3000	3090	3000	3090	3000
3050	2990	3050	3000	3050	3000	3090	3000
3050	3000	1050	3000	3050	3000	3090	3000
2050	3000	3050	3000	3090	3000	3090	3000
3050	3000	3050	3000	3050	3000	3050	2000
3050	3000	3050 3050	3000	<b>1000</b>	3000	3050 3050	3000
QQC	3000	3050	3000	3050	3000	3050	3000
9050	3030	3050	3000	3050	3000	3050	3000
7050	3000	1050	3000	3090	3000	3990	3000
9050	3000	3050 3050 3050 3050	2990	3050	3000	3050	3000
5050	3000	3050	2990	3050	3000	3050	3000
3050	3000	3050	2990	3050	3000	3050	3000
3050	3000	3050	2990	3050	3000	3050	3000
3050	3000	3050	2990	3050	3000	7050	3000
3050	3000	3090	2990	3090	3000	3050	3000
3050	3000	3050	2990	3050	3000	3090	3000
3050	3000	3050	2990	3050	3000 3000	3050	3000
3050	3000 3000	3050	2990	3050	3000	3050 3050	3000 3000
3050		3050	3000	3050	· ·		_
3030	<b>3000</b>	3050	3000	3050	3000	3050	3000

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# SERIAL BO. 1269

		iin.	CYCLE TES	A PARTIES	•		
	DESIGNATION	WACKING "	RESEATING	Caldillo	MISEATING	CETT CE THE	RESLATING
FREESTER	PRISONE	PRESTRE	PRESSURE	PRESIDE	PRESSURE	PRESSURE	PRESSURE
(2012)	(peig)	(pedg)	(peig)	(aska)	(pelg)	(psig)	(pedg)
The party	2950 pois		3190 pale	200	3190 peig	3200peig	3190
7050	2950	3200	3390	200		3500	3190
36.5%	2950	3200	31.90	3260	3190 3190	3200	71.90
3050	2770	3200	3130	3290	3130	3500	3190
2050	2990	3800	3190	3890	3190.	3200	3190
3050	2950	3200	3150	2200	33.90	3200	3350
双尖	2950	3800	3190	33250	3190	3200	3190
<b>3050</b>	2950	3800	3190	320	3190	3200	31.90
<b>3050</b>	2950	3200	3190	3200	33.90	3200	3190
NA	2950	3200	30.90	3200	3190	3200	3190
3050	2990	3200	3130	3200	3190	3200	3190_
3050	2970	3200	3130	3200	2190	3200	30.90
<b>X</b> 50	5440	3363	33.90	3200	30.90	3200	1190
W;O	2990	3200	3190	3200	3130	3200	3190
<b>305</b> 0	2590	3200	33.90	3700	3190	3200	3190
<b>305</b> 0	2390	3290	3390	3200	3390	3200	31.90
3050	22.90 30.00	3200	33.90	3200	3190	3200	3190
<b>30</b> 50	XXX0	3200	33.90	3200	5190	3200	3190
10 SO	3000	3400	3190	3200	33,90°	3200	3190
<b>1050</b>	3000	3200	31.90	3200	3190	3200	31.90
3050	3090	3200	3380	3740	3290	3200	3190
30 <b>5</b> 0	3000	3200	33.90	( and	3190	3200	3190
3050	3000	3200	<u> </u>	3800	33.90	3200	3190
2050	'3000	7200	3193	3200	3190	3200	3130
2050	3900	3200	33.90	3200	31.90	3200	3190
3050	3000	3200	3190	3200	3190	3800	3190
3050	3000	3000	3190	3200	3190	3200	3150
MS3	3000	3200	230		31.90	3200	3190
<b>305</b> 0	3000	3200	3190	3200 3200	3330	3200	3190
3050	3000	3800	3390	3200	31.90	3200	3390
3050	300C	3200	3190		3390	3200	1190
<b>3050</b>	3900	3200	3190	3275	3190	3200	1190
VALVE EESE		3200	3190	3200	3150		3333
	10	3830	1190	3300	****	3200	3350
3200	31/90	3200 3200 3200 3200 3200	1190 1190 1190 1190	7300 7300 7300 7300 7300 7300 7300 7300	東 東 東 東 東 東 東 東 東 東 東 東 東 東 東 東 東 東 東	3200	non
3200	11.90	3200	33.90	1	347U	1200	1190 1190 1190 1190 1190
3200 j	31,90	3200	3190	300	#190	3200 3200	3190
3200	33.80		Tion:	3400	2000	3200	1190
3200	3190 3190	3200	3190	3200	#100	3200	1190
3200	3250	3200	3190	3333	200	3200	3190
3200	3200	3200 3200 3200 3200 3200	1190 1190 3190 3190 3190	3200	1200		74,70 71 90
3200 3200 3200	3280	3100	3190 ,	3200	600	3200	1190
3800	1190 1190 1190 1190 3190 3190 3190 3190	3200 3200	3290	3200	1190	3200 3200 3200	71.90
	3190	3200	3290	3200	1190	3200	1200
<b>320</b> 0	7750	3200	3130	3209	3190	3200	17.90
330	3150	3200	3130	3200	3190	3200	1190
3200	3150	3200	7130	980	3290	3200	1190
<b>320</b> 0	3150	3200	33.90	3800	33.90	3200	3190
3600	3350	3200	9190 9190 9190 9190 9190		3190	3200	N90 1190 1190 1190 1190 1190 1190
1200	3250	3200	3190	3200	31.90		1190

### CONTRACTOR AND COMPANY, 3200 RESTORMENTED VALUE, TYPE 31346-4.

orata la L	MAYIN	KRACK <b>IK</b> O	CICLE IN		ELSKATING	CRACK THO	FREEATING
1.59 PM 0515055		PERSSURA	PRESSURE	PRESENT	PRESSIRI	PRESSURE	PRESURE
(pelec)	(paig)	(pale)	(paig)	(pots)	(paig)	(paig)	(pale)
SOCOOLE	3190 paig		3180 paig				
3200	3.90	3500 here	3190 berg	3200 pel	3180 peig		
3200	200	3200	3180	3200 3800	32.80		
1270	2300	3200	3180	3200	3180 3180		
3300	9.90	3800	1180	3/00	1280		
3200	3290	3500	7280	3200 3200 3200	3000		
3200	7190	3200	3180	1200	10.80		
1.000.5	11.90 i	3500 3500	31.80	1			
2000	3190 /10	3200	2.80				
3300	1120	13200	30.80	3		1	
3200	Sept 1		31.80			ł	•
2200	160	3200	20.80				1 1
3000	3190	3900	3180				1
3200	NO	3.300	30.80			Į .	
3200	3150	3200	3180			l	
3800	3190	73500	30.80	100		ł	
3200	31.90	13200 13200	3180			•	
3200	1130	13200	30,00				1
3800	3300	3200	11.00				
3300	3180	3200	30.60			ł	
3500	3.80	p200	30.80				
3200 3200	3190	0300	2.80		• ;	<i>2</i> .	
3200	3130 3130	<b>1309</b> :	32.00			1	
3200	190	hear.	2 80			1	1
3200	3190	0200 0200	3180	1			
3200	71.90		2080				
3330	100	3200 3200	E Str. →	1			
3200	186	B200	11.60			ł	1 3.1
<b>3200</b> 0	3160	320C t	12.80	1 6. 3			
3200	J1.00	920G	32.80	1 13	<b>.</b>	1	
12000	3280	200	1180 1180				
3200	3180 .	\$200		1 . 2.		1	
3200	en an All	<b>2000</b>	1280		Page 1	1.	1-1
3200	100	5200	<b>50.80</b>	1	13.73		4
3200 3200 3200 3200 3200 3200	180 180 180 180 180	3200 3200 3200	1180 1180 1180 1180 1180 1180 1180 1180				1 1
3200	110	200	10.80	4.5	1 1 1 1 1 1	1	1
J233)	7100	. 100	9180		3.33	1	
JA'A'	3100	140	jn.80		70		
000E	3100	1000	10.80			1	1
3200	JIDV TIDA	B200	3180			<b>3</b> .	1
3200 3 <b>20</b> 0	1180 1180 1180 1180 1180	200 200 200	<b>20.50</b>	-		1	1
3200	11 83	B500	五四		F. 2.4	1	
3200	neo-	200	Y CO				
2000	11.80		F1.00			1	
3000	1100		2100	N.	37 · · · · · · · · · · · · · · · · · · ·	1	
1.00	31 PM		2180	1 3 m	7		
3200	1180	200 200 3200	3160 3160 3160	1 .	•	1	
3200	1100	73300	1130	1.		1	1

### THE MELG-L. STRIAL FREDER 1280

#### IV. TENTELATURE THEY RESULTS

	(pela)	Procession (Sept.)		Creoking Pressure (pelg)	Presenting Presents (17814)
The harted of the second of th	3800 1190 1190 1190 1190 1190 1190 1190	11.50 11.50 11.50 11.50 11.70 11.70	IV Operation at 11 V. (The valve was cooled to 11 VI in a temperature character case then removed and tested in-speciatoly.)	paig at temperal Leaked at Leaked a bove 290 5007.	bere 2000
	1180 1190 1196 1190 1190 1190 1190 1190	1170 1180 1175 1175 1175 1175 1175	IV. d. Laca temperature oper- stick (70°7). (Valva stabilized at room temper- ature after ar- powere at 0°7.)	189 199 199 199 199 199 199	1170 1180 1185 1175 1175 1175 1175

### THE SUBS-L, SETTLE HERER LIES

#### V. YESATION TEST RESULTS

Procedure: The valve was subjected to the following vibration fre-

5 to 20 ope at 0.4 inches could implitude
20 to 2000 ope at 102

Tilerature was applied separately (1) slong (parallel to) the exis (of remointing) of the peoplet and spring and (2) perpendicular to the axis of the peoplet.

Laurings during vibration was detected by names of a 1/k inch rubber hose, one and of which was connected to the value outlet port and the other and innerest in value.

s. Hieratics applied parallel to axis of peopet and spring.

Threston Fractures	(epe)	Laukige	
5 - 125 425 - 150 150 - 525 525 - 2000		Very repid leakage (& to Emassivé laskage (viole 0	10 bubbles/eec.)

b. Tiretion applied commercialist to axis of poppet and applies

Fisherian Tracountry (eps)	Leikige	
5 - 23 23 - 75 75 - 110 110	O Slight leakage (less the Rapid leakage (2 to 4 be	m i hubble/sec.)
120-250	Sery repid leakage (lite	10 bubbles/sec.)
150 - 160 150 - 500	Very rapid laskage.	
500 - 550 550 - 555 555 - 2000	Sligh lessera C	

<sup>1</sup> See Flyare b

<sup>2</sup> See Figure ?

1054 wsc \$787

WEESTLE SYSTEMS IN CISCOST

REPORT 1250/909010

Andreson Chremood and Company, 3200 psid relief valve, Type 33516-1, Serial Fo. 4160

		4200		* A # # A A A A A A	a naont eo	• =	•	*
	CACATE	PESSATUR	MACLIED.	CICLE TES	CRACEING	RESEATING	CALCE INC	RESEATING
Į	PRECIE		762SSIZZ	PRESSUR	Pressure	PRESSURE	PRESSURE	PRESSURB
	(pels)	(0828)	(paig)	(pelg)	(cars)	(psig)	(psig)	(palg)
	2050	The second second	3180	3170	3180	31.70	11.80	3140
1	3130	2475 1180	180	1170	31.50	3170	1180	30.70
4	3190	100	1180	3170	1180	3170	33.80	3170
į	3390	31.80	3180	3170	31.80	<b>1170</b>	3180	3179
ż	3200	31.80	31.80	3170	3180	31.70	3190	3130
	3200	3190	31.80	317å	3180	3170	3190	3180
	3200	1130	32.80	3170	3180	3170	3190	31.80
	3200	33.60	31.50	3170	31.60	31.70	3190	31.80
,	3200	30.80	32.80	3170	32.80	33.70	3190	31.80
-	3150	3150	31.80	3170	3180	3170	3190	31.80
·	3190	32.75	33.80	3170	33.80	3170	31.90	31.80
	33.90	3275	<b>3180</b>	33.70	32.80	3170	3190	3180
-	3190	31.75	3180	3170	31.80	31.70	3780	31.80
,	31.90	3175	3180	3170	31.80	31.70	3190	31.80
į	3190 °	31.75	<b>31.80</b>	3170	3180	33,70	3190	31.80
-	31.80	<b>丸75</b>	31.60	31.70	31.80	3170	31.90	3180
	31.90	33.75	32.80	3170	31.80	3170	3190	31.80
	3190	3273	31.80	3170	3180	3170	31.90	3180
١	3190	31.75	31.80	3170	3180	31.70	3190	3180 3180
1	3190	31.75	31.80	31.70	32.80	3170	3190	3180
٠,	31.90	3175	31.80	3170	31.80 31.80	3170	31.90	31.80
,	31.90	31.75	31.80	3170	31.80	3170 3170	3190 3190	3180
ì	32.90	3175	3180 3180	3170	3160	3170	3190	3160
`,	3190	3175	31.80	3170 3170	3180	3170	3190	3180
Ę	3190	3175 3175	11.80	3170	3180	3170	3190	3180
1	3190 3190	3175	3180	3170	3180	31.70	3190	3180
`	33.50	175	32.80	3170	3280	3170	3190	31.80
	31.90	3175	1180	3170	3280	3170	3190	31.80
,	3190	3175	31.80	3170	3180	3170	3190	3180
r	31.90	3275	3180	3170	31.80	3170	3190	3180
-	3190	3175	31.80	3170	31.80	3170	31.90	31.80
,	3190	3175	31.80	3170	3180	3170	31.90	3180
	3190	31.75	32.80	3170	31.60	3170	3190	31.80
-	3190	31.75	30.80	31.70	31.80	30.70	31.90	NEO
-	3190	3175	31.60	3170	31.80	3170	3190	1180
	3190	3175 3175	31.80	30.70	31.80	31.70	3190	31.60
	3190	31.75	37.60	3170	3180	3170	31,90	3180
,	31.80	31.70	31.80	31.70	31.60	2170	37.20	3180
	31.60	31.70	37.80	3170	31.60	3170	31,90	32.60
	31.80	3170	37.80	3170	3160	3270	3190	3160
1	3180	33.70	30.60	21.70	3180	3170	3150	31.60 31.80
	31.50	2170	27.60	3170	3160	3170	31.00	20.60
	NCO NEO	3170	31.60	71.70 31.70	neo neo	32.70	NEO	3180
	37.63	3170	AL AL	3170	31.60	n70 9179	nço	3180
	3160	3370	NGO	3170	11.60	1270	3250	31.60
	32.80	3170	neo	3170	neo	1170	3250	1160
	3180	3170	no	3170	neo	1120	nen	3160
į	1769	113	ÉG	Nio	RB	233	COR.	nci
- 1		1	- January	1 Marst M		7		

TO THE PARTY OF TH

### ANDERSON GREENWOOD AND COMPANY, 3200 PSIG RELIEF VALVE, TYPE 3JSh6-h, SERIAL NO. 1160

PRESSURE			YI.	CYCLE, TES	T RESULTS	The state of the s		
Paris	CRACKING			RESEATING	CRACKING			RESEATING
190								~
100	(psig)	the second named in column 2 is not a designated of the last of th						
1950		3180						
190								
180								
180						3190		
150		31.80						
190				31.00				
180		31.00						
190		3100		31.80				
190								
190						30 68		
190								
190								
190								
190								
190								
190								
190								
190						31.60		
190				2000				
190								
190								
190								
190					3200			
190			3200					
190								
190			3200					
190			3200	3190	3200			
190		31.80			3200			
N90		31.60		3190	3200			
No		3180			3200	31.90		
190								32.90
190         180         3200         1190         3						<b>3150</b>	3200	31.90
190         180         3200         1190         3	31.90							31.90
190         3160         3200         1500         3200         1500         3200         1500							§200	3150
NSO	31.90					MSO	3200	3150
190	31.50							3190
No	31.90							1150
1190         1180         3200         1190         3200         1180         3200         3200         3200         3200         3200         3200         3190         3200         3190         3200         3190         3200         3190         3200         3190         3200         3190         3200 <th< td=""><td>3190</td><td>JI 60</td><td></td><td></td><td></td><td>3720</td><td></td><td>3190</td></th<>	3190	JI 60				3720		3190
NSO	31.90	31.60						31.90
NSO         NEO         3200         NSO         NSO         3200         NSO         NSO <th< td=""><td>3150</td><td></td><td></td><td></td><td></td><td>37.50</td><td></td><td>3720</td></th<>	3150					37.50		3720
NSO         NSO         3200         NSO         NSO         3200         NSO         NSO <th< td=""><td>31.90</td><td></td><td></td><td></td><td></td><td>3150</td><td></td><td>3150</td></th<>	31.90					3150		3150
NISO         NEO         3200         NSO         32	3150	3160		31.00		3150		3720
N50         N50         3260         N50         3200         N50         N50	3150	3100				2720		N.SO
NSO         NSO <td>30.50</td> <td>3800</td> <td></td> <td>81 64 77 70</td> <td></td> <td>2150</td> <td>3200</td> <td>7720</td>	30.50	3800		81 64 77 70		2150	3200	7720
NSO NEO 3200 NEO	3150	71.00				31170		3150
NEO NEO 3200 NEO 3200 NEO 3200 NEO 3200 NEO 3200 NEO	3150	3700		33.00		الاخد		Myo
			1200	ngo		2002	3200	3050
remove the tree to the control of th	FORM MIS 47#7		1			2659	7667	الملاي

#### LOCKHEED AIRCRAFT CORPORATION

REPART LASD/909010

#### ANDERSON CRESTICOOD AND COMPANY, 3200 PSIG RELIEF VALVE, TIPE 35816-1, SERIAL DO. 1160

Anderson Greenwood and Co., 3200 PSIG Relief Valve, Type 33846-4

#### Serial Number 4160

#### VII TEMPERATURE TEST RESULTS

TEST CONDITION	CRACKING PRESSURE (PSI)	RESEATING PRESSURE (PSIG)
VII.a. Operation at 160°F. (The valve was heated to 160°F in a temperature chamber and them removed and tested immediately.)	3190 3190 3180 3170 3180* 3180* 3160 3160 3160* 3160*	3170 3160 3170 3150 3170 3170 3140 3140 3140 3150
VII.B. Room temperature operation (70°F). (Valva stabilized at room temperature after exposure at 160°F).	3190 3190 3190 3190 3180 3180 3190 3190 3190	3180 3180 3180 3170 3170 3170 3180 3180 3170

VII.c. The valve was cooled in a temperature chamber while pressurized to 2700 PSIG with helium and began to leak when the valve body temperature dropped to  $10^{\circ}F$ .

The valve was then disassembled and inspected. All internal parks, including the popper O-ring and valve scat, were in good condition. (See Figure 8)

A new poppet O-ring (designated compound No. 435-90) was installed and the valve was reassembled and subjected to an additional temperature test.

FORM MICE STET

Andôrson Greenwood and Co., 3200 PSIG Relief Valve, Type 3JS46-4 Serial Number 4180

VIII TEMPERATURE TEST RESULTS1

TEST CONDITION		RESEATINO PRESSURE (PSIO)	TEST CONDITION	CRACKING RESEATING PRESSURE PRESSURE (PSIG) (PSIG)
VIII.a. Room temperature constion (60°F)	3230 3230 3230 3230 3230 3220 3230 3230	3210 3210 3210 3210 3210 3210 3210 3210	loosened slight O-ring seal was A new poppet O- and new le O-ri	The valve leaked at temperatures below 42°F.  Isassembled and seat assembly had ly and the nossle partially extruded. Fing (compound 435-90) of (Viton-A) were alive was reassemble
ist OF.  (New valve was cooled to OF in a temperator character character character character character)	3190 3180 3180 3180 3190 3190 3200 3250 3250	3150 3120 3100 3100 3100 3110 3120 3180 3180 3180 3200	VIII. Room temperature operation (70°F)	3210 3150 3210 3140 327.0 3140 3300* 3300* 3250 3160 3250 3160 3240 3170
VIII.c. Rocal temperature at temperature after exposure at 160°F.)	3260 3260 3250 3250 3260 3260 3260 3260 3260	3240 3240 3240 3240 3240 3230 3230 3230	VIII.S. Oper- ation at OF. (Sara in VIII.D.)	Valve leakon excessively at OF and 13 F.
VIII.d. Operation at 160°F. (The valve was heated to 160°F in a temperature chamber and then removed and test-od immediately.	3240 3240 3250 3250 3250 3240 3240 3240 3250	3230 3230 3230 3210 3210 3210 3210 3210	Testing was disc valve was return facturer.	continued and the ned to the manu-

A compound No. 435-90 peoplet O-ring was used during this test.

2 Sep Figures 9 and 10

REPORT 1350/909010

Anderson Greenwood and co., 6500 psig relief valve, type 3/51/6-3 Serial number 1/179

#### I. INSPECTION RESULTS

Visual inspection of this valve revealed no evidence of external damage, defects, or contaminants.

II. TEMPERATURE TEST RESULTS

II. TEMPERATURE TEST RESULTS										
TEST CONDITION		reseating Pressure (PSIG)		TEST CONDITION		reseatik Pressure (Psig)				
II.a. Room temperature operation (70°F).	6500 6500 6460 6500 6480	6300 6250 6210 6300 6300	E) 4 5 4 85	II.d. Room temperature operation (70°P)	6380 6360 6360 6400 6360	6150 6180 6180 6160 6180	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			
11.8. Operation at 160°F. (The valve was	4500 6500 6500 6500 6440 6400	6300 6280 6310 6300 6300 6300	Chresham of the	The valve started leaking at press in excess of 1500 PSIC when an att was made to reset the cracking pressure to 6500 PSIC. Disassembly an inspection of the valve revealed that the poppet O-ring had failed (compression fracture).2						
heated to 160°P in a temperature chamber and their removed and tested immediately.)	6390 6380 6380 6380	6290 6200 6200 6200 6200 6200		A complete set of Viton-A O-rings were then installed in the valve and it was reassembled, roset and retested.  II.e. Room 6550 6340 6340 6340						
II.o. Operation at OF. (The valve was cooled to OF in a temperature chamber and their removed and				operation (70°F).	6550° 6550° 6510 6650° 6650° 6550° 65140	6320 6320 6320 6330 6320 6320 6310				
removed and tested immedia ately.)  The valve was disassembled and inspected. A damaged nossle 0-ring scal was discovered which apparently had been pinched during assembly. A buna-N 0-ring was installed on the nossle and a Viton-A (90 durometer) 0-ring was installed on the poppet. The valve was reassembled and retested.			Name of the Party	II.f. Oper- ation at OF. (Same as II.c.) below 14 To The value was disassembled and a new popper O-ring (compound No. 4) was installed. The valve was then reassembled, reset and retested. The blowdom ring was, also, adjust to raise the rescating pressure			35=90)			

<sup>1</sup> Sco Figures 11 and 12

FORM 450 975

<sup>&</sup>lt;sup>2</sup> See Figure 13

### And eson greenwood and co., 6500 psig relief valve, type 31546-3 Serial number 4179

II. TEHPERATURE TEST RESULTS (CONTINUED)

<u>,,}</u>	n.	TEMPERAT	uke test i	Ľ	SULTS (CONTINUED)		~
-			RESEATING	П			RESEATING
TES	T COMDITION		PRESSURE		Test condition	PRESSURE	
منينية ٥	<del>, ```</del>	(PSIO)	(FSIG)	Ų		(PSIC)	(PSIG)
	g. Room	6550	6480		The valve was di	sagnemble	d and
	perature	6550	6410	П		nossle as	
	ration	6500	6410	4	was loose and th	e nossle	0-ring
(80	( <u>a</u>	6490	6410		was partially ex	truded fr	on its
. "	•	6500	6420	ĕ	groove. A new p		
રાં છે.	t	6500	6420		pound No. 435-90		
٠, ٦,	. , , , , , , , , , , , , , , , , , , ,	6430	6400	Į,	O-ring (Viton-A)		
ı	-	6490	61100		and the valve wa	s reassem	bled and
- K. T	• )	6490	6400		retested.		Ì
		6490	61,00		II. k. Room	5600	6500
		6550	6410	۱	temperature	6590	6450
II.		Valve 1	eaked at	H	operation	6590	6450
ati	on at 18°F.	tempera	,	ı	(75°F).	6500 <sup>th</sup>	6489
	lvė was cool	below L	O°F.	֚֓֞֝֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֡֓֓֡֓֓֡֓֓֡֓֓֡֓֓֡֡֡֝֡֓֡֓֡֡֡֝֡֓֡֡֡֡֓֡֓֡֡֓֓֡֡֡֡֓֡֓֡֡֡֡֡֡	117.010	6510	6480
	to 180F in			ŀ		6500	6460
a t	emperature		_	П		6500*	6480
òhe	mber and then		*		. 4	6500	6450
	oved and test	L ·	٠			6490	6400
ed	immediately.)	~	_	I		6480	6400
II.	i. Room	6590	6510		II.1. Oper-	6650	6490
<b>A</b> ,, .	perature	6580	6510	ı	etion at 0°F.	6590	6420
	ration (70°F)		6500	П	(Walve was cool-		61100
	lve stabi-	6550	6500	П	ed to O'F in a	6500*	6390
, ,	ed at room	6550	6500	1	temperature	6510	6400
	perature	6550	6470	H	chamber and then		
	er exposure	6530	6470		removed and test		
at	18°F.)	6600*	6410		ed immediately.)		j
1		6600*	6410				6130
1.		6520	6400	П	II.m. Room temperature	6490 6480	6410 6400
177	J. Oper-	6480	6410		operation	6480	6400
nti	on at 160°F.	6480	6400	Н	(75°F).	6500	6300
	Ivo was heat-	6550*	6350	l	(12 1)	6480	6100
64	to 160°F in	6550*	6350	ı	TT O'	the control of the control of the	THE PERSON NAMED IN COLUMN 2 IN COLUMN 2
	emperature	6480	6410	۱۱	II.n. Oper-	6390	6300
	mbor and then		6310	H	ation at 160°F.	6350	6320
	oved and test	1 4.	6380	H	100 F.	6360	6330
	immediately.	6490	6370	Ш		6350	6330
1 50	minerana Acial a	6490	6400			6400*	6350
		6550	6350		II.o. Oper-	Valve 1	eaked at
1					ation at OF.	tempora	tyres
		ļ	l	ļ		below l	5'F.
ŀ	٥				Testing disconti	-	
1 .	*		l		returned to manu		

C

# PAPT NO. 44-TG-8-SP, SERIAL EO. 498

#### i. iispectici esolts

Visual inspection of this valve revealed no evidence of dazage, defects, or contaminants.

II. TEAPERATURE TEST RESULTS

TEST COMPLICA	Cracksed PEZSSUR (PSID)	Acseatild Pressure (7810)
I.a. Room temperature operation (75°)	3520 3510 3500 3180 3180 3180 3150 3550	3350 3350 3325 3325 3340 3310 3330
I.b. Operation at OF	3490 3550* 3550* 3490 3490 3490 3490 3460	3320 3330 3310 3330 3330 3300 3310
I.c. Operation at 160°7	3450 3390 3390 3370 3350 3450 3450 3400 3120	3300 3220 3230 3230 3220 3240 3300 3300

### PART NO. 14-11-8-3P, SECTED WILLIAM

	The state of the s	- proposed and the		THULL	ng pang salah s	aggerial <del>magneriage</del> is a construction of the construction	Samue co <b>ntraven</b> e con experimental escribe
	TATING	CRACALINO	RESEATTING	CIM KINS	BESEATING	GUICKING	RESEATING
	THEOREM	FRISTURE	Paesmill	TO BOOK RE	PHESSURE	PRESSURE	PRECIURE
STATE OF STATE	. (pr <b>in)</b>	: (peig)	(peis)	) (P (F)	(psig)	(paig)	<u>(psis</u> )
y iku	390	3430	3320	32-36	3330	3420	331:0
	377	3430	3320	36 70	3330	3450	3350
yla# b	3740	<b>3</b> 0.30	3320	<b>32</b> .20	3330	مبليلا	3350
11.5	336	3h30	3320	32:20	3330	3140	33160
	1370	34,30	3320	31.80	3330	3440	3350
Man n	1370	3130	3320	34.20	3330	3440	3350
	3730	34,30	3320	31:20	3330	3lyk0	3350
11.2	3330	34.30	3320	31.20	3330	3430	3350
160	3330	34,30	3330	31/20	3330	3430	3350
11.20	35 <b>20</b>	34,30	3330	31.30	3340	3420	3340
200	3520	31,30	3330	31:20	3340	3420	3340
Ni23	3320	74-bo	3330	31.20	3340	3490	3340
	3,320	2140	3330	31,30	3340	3420	3340
	3320	3640	3330	34,30	3340	3420	3340
3420	3320	3140	3330	3430	3340	3420	3340
3420	3320	3140	3330	31,30	3340	3420	3340
3423	3320	3440	3330	34.30	3340	3420	3340
3420	3320	3hho	3330	34.30	3340	3420	3340
W27	3320	3440	3330	34.30	3340	3420	3340
31:2)	3320	Milo	3330	31.30	3340	3h20	3310
3420	3320	3440	3330	3.30	33 <b>4</b> 0	3420	3340
3753	3320	3620	3360	31:30	3340	3450	3350
34.60	3320	34.2C	3330	34,20	3340	<b>مبلبلا</b>	3340
3170	3320	3420	3330	3420	33b0	3420	331,0
3420	3320	31.20	3330	3420	3340	3420	3340
1630	ino	3420	3330	N.20	3330	3420	3320
N.O	3200	34.20	3330	31.20	3330	37150	3320
A.F.	3300	34,20	3330	34.20	3330	3420	3330
2630	370	3430	3340	34.20	3340	3620	3330
3433	3700	34.30	3340	31-20	3340	3420	3330
3133	1320	3430	3340	34.20	33b0	3420	3330
9 <b>1.3</b> 0	ino	3420	3330	34.20	33k0	3420	3330
3430	3310	34,200	3330	31.20	3340	3420	3330
31.30	INO	3420	3330	31.20	3340	3420	3330
ed as	3300	21.20	3330	31:20	3340	3420	3330
94.35	320	34.20 34.20	3330	1 20	3340 3340 3350	3h20	3330 3330
14.50	330	11.20	3330	3ú.20	1150	3420 3420	3330 3330
140	3320	3k20 N.20	3330	32.20	3350 3360 3360 3360	3420	3330
<b>343</b> 5		34,20	3330	11:00	1300	3420	3330
<b>\$15</b>	3310	34,20	3330	£20	1110	3420	3330
	3300	¥120		3630	3350	3420	3330
34.27	3320		3330	34.20	3350	3120	3330
3.20	3370	3420 3420	3330	36.50	3214	3420 3420 3420 3420	3330 3320
23	330	3420 3420	3330	3750	3350	1420	3320
1400	3330	37.50	3330 3330	3620	1116	3420	3320
	MO	3420	3330	¥.20	3140	3420	3330
\$150	371.0	UAME.	7770	\$ 70	3314	3420	3330
- 3550	3320	1,20	3330	<b>1</b> .30	3350 3350 3350 3360 3360 3360	3420	3330
	3320	3h20	3330	30.20	3340 3340	3420	3330
		34.20 34.20	3330 3330	11.20		3420	3330

### PART NO. ILL-TO-8-SP, SERIAL NO. 198

Com Sin

Fried Street	Services and the services of t	POTE CONTRACT	CYCLE TE	CONTRACTOR OF THE PARTY OF THE	CA SERVICE MANAGEMENT OF THE SERVICE	CONTRACTOR ANTONIA PARTIES	THE BALL STORY WAS A SECURED TO
CHACA ES	MITARLES	CHACCING	RESEATING	CRACLING	RESEATING	CRACAING	RESEATI
PRESS RE	PRESSILE	PRESSURE	PRESSURE	PRESSURE	PAFSSULE	PRESSURE	PRESSIR
(psli)	(poig)	(psig)	(psig)	(psig)	(psig)	(pcis)	(palg)
3420	3330	3/150	3330	31110	3350	3420	3350
31:20	3330	3420	3330	3100	3350	3420	3350
M20	33 <b>3</b> 0	3420	3340	3420	3340	3/150	3350
31 <b>12</b> 0	3 <b>33</b> 0	3420	3340	3420	3340	31,10	3350
<b>3420</b>	3330	3/150	3330	3620	3360	3640	3350
J420	3330	3420	3330	3420	3340	3640	3350
3420	3330	3425	3330	3420	3310	3440	3350
3420	37.0	3425	3330	3420	33b0	3420	3350
3li 20	3 <b>3LO</b>	3430	3330	3620	3350	3420	3350
3420	ملاد	3420	3340	3/150	3350	3420	3350
3420	3340	3420	3340	3lahG	3350	3420	3350
3420	<b>33لى</b> 0	3/150	3330	31,30	3350	3620	3350
3420	33 <b>4</b> 0	3420	3340	3430	33b0	3450	3380
3420	33b0	3420	3310	3420	3350	3440	3360
3/150	3340	3/40	3310	3420	3350	3620	3360
11,20	3340	3420	3340	3420	3350	3420	3360
3420	3360	34,20	3340	3420	3350	3420	3360
3450	3330	3450	3340	3620	3350	3420	3350
3450	33b0	31,30	3360	3420	3350 3350 3350	3h20	3350
3450	3340	3450	3340	3420	3350	3420	3350
<b>M</b> 50	3310	3430	3340	3420	3350	3420	3360
31,50	3340	3430	33b0	3420	3350	3420	3360
3450	3340	31,30	3340	3420	335C	2420	3360
3450	3340	3420	3340	3620	3350 3350	3420	3360
اللا اللا	3340	3420	3340	3420	3350	3420	3350
3440	3340	3420	3340	3k20	3340	3h20	3350
3430	3310	3420	3340	3420	3350	3k20	3350
3430	3340	31,20	3310	3610	2350	34.20	33%
<b>%3</b> 0	3340	3750	3310	3430	3350	3420	3360
3130	3330	3420	3340	3130	3350	3420	3360
3 <b>1.3</b> 0	3330	3420	3340	3430	3350	1620	3360
34.20	3330	3420	3340	3630	3350	3420	3360
	33 <b>3</b> 0	3420	33k0	3430	1260	3420	2244
31,20	لاتررز ماهد		مادد	21.20	3350	31.00	7,700
3420 3420 3420 3420 3420 3420 3420 3420	33L0	31:20	3340 3340 3340 3340 3340 3340 3340 3340	3420	3350 3350 3350 3350 3350 3350 3350 3350	1420 1410 1410 1420 1420 1420 1420 1420	3360 3360 3360 3360 3350 3350 3360 3360
3461	2000	3h20	3310	3420	3350	3830	3,500
3420	3340 3340 3330 3330 3330 3330 3330 3330	3420 3420 3420 3420 3420	لورر مادد	3420 3420 3420 3430 3430 3430 3430 3420 342	1270	710	7,700
31120	777 <b>U</b>	31.20	<i>نهرر</i> مادد	31.50	)37U	31.00	7,700
344V	125C	31.20	, UUCC	مدارو	337U	MAN	3370
	پرور محمد	34,00	שנננ	MILLO	3570	MACO	3330
5440	پرور م	3820	33 <b>0</b> 0	1 Sitter	3550	<b>JA20</b>	3750
J15269	تحررر	3420	ישננ	טכאג	3330	7520	7770
342	3330	3420	73HD	3430	3350	7420	3300
3420	3330	3420 3420 3430	3300	3430	3350	7420	3,350
3420	33 <b>3</b> 0	<b>3130</b>	JAC	20	3350	3420	3360
3/150	3330 3330	3430	3340	3420	3340	Ze OCIAC	3360
3420	3330	3430	3300	3420	3,50	700	3340
34.20	3330	3430	3340	34:20	3350	3410	3360
ુરા 2⊜	3330	31,20	33b0		3350	3430	3350
31.20 31.20	3330	3420	3340	3420	3350	3430	3350
31.20	3330	3420	3340	3420	3350	3420	3360

1240

### VALUE ENGRESSION OF A LILIE VALVE PART IN LA LA BAST STREET, NO. 1488

5 5 5			CYCLE TES	" জেলি <b>এই</b> কোৱাইকাটা	•		e
	DESENTING.		RESEATING	CRACKING	PESEATING	CAACLIEG	RESEATING
		PRESSURE	PRESSURE	PRESCURS	PRESSURF	PRESSURE	PRESSULE
	(palg)	(peig)	(psig)	(pe13)	(p:1g)	(peig)	(peig)
		To the state of th			(2000)	1	de la companya della companya della companya de la companya della
man and an and an and an	3350	3360	3290	ne nive			
	3360	3360	3290			1 1 1 C 1 C 1 C 1 C 1 C 1 C 1 C 1 C 1 C	•
, #81C	3260	3360	3290				1
	3360	3360	3290	e. E			
	3360	3360	3290	j		100.00	*
	3 <b>36</b> 0	3360	3290	Ę.			
	3360	3350	3290				
	3360	335	3290	<b>₹</b> £			
3.30	3360	3350	3290		:		
3120	3360 3360	3350	3290	<b>§</b>	•	1	
11:20 31:20	3360	3350	3290	range of the control	ię.		
0.00	3350	3350	3290		s L	4	
3120	3350	3350	3290 3290			Ì	•
31.20	3350	3350		4	e		7
	3350	3350 3350	3290 3290		4 /		ŧ
51.00	3360	3350	3290				
200	3360	3340	3300		r		
3120	3 <b>360</b>	3350	3300	}	į		1
	3360	3350	3300				
3000	3360	3350	3300	•			
<b>3</b> 1,20		3350		Ì			
34,00	3360	3350	3300			Ì	
3390	3325	3360 3360	3300	1			
3380	3370	3360	3290				
3370	3325	3350	3290		i.		
33/20	3300	3350	3290	į.	•		
3350	3300	3350	3290				
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3357	3290	3350	3290	j			:
1 3350	3290	3350	3300	4		g.,	
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9270	3300	3350	3300	•			i
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) )350	3290	3350	3290				,
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9056	3290	3360	3300		•		• •
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y something	3290	3360	3300				-
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The state of the s	J & J &	1270		<b>4</b>	desire i maneria de la composición della composi	I	أبالسيابات المتعاصفا فالخا

THE TANKE OF THE PROPERTY OF T

#### PART MARKETS, 500 MIN MARK WARE, MAR SA W-50-8-8-7, SMINL SA 168

#### of the later than in the

	(3) (3) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	Section : Francisco (Mag)
Ba. History of 1877	1256 1306 1306 1306 1306 1306 1306	型
Ma. Operation of com- temperatures (1977)	7306 750 750 750	3460 2570 3560
	356 356 356 356 356 356	7250 1125 7320 1136 1250 3350

# PART NO. 161-173-8-SP, SERIAL NO. 198

#### IV TEMPERATURE TRUE RESULTS

TEST CONDITION	CRACKIED PRESSURE (PSIC)	RESEATE J PRESSURE (FSIO)
30.8. Op <b>ération et 160</b>	3280 3240 3240 3300 3300 3240 3230 3230 3300	3140 3150 3150 
17.8. Operation ut roo temperature (709)		3050 2950 2980 3000
137 5. Operation at 0°	3400 3340 3340 3340 3350 3350	3100 3125 3120 3120 3050 3050

#### PLUID MECHANICS, 6500 POID RELIEF VALUE

PART 80. 14-19-8-3P, SERIAL NO. 197

#### I. INSPECTION RESULTS

Visual inspection of this valve severied no evidence of damage, defects, or contemnsate.

#### II. TEMPERATURE TEST RESULTS

II. TERMINE TET PEULE								
TEST COSPITION		essited Fixsure (F5ID)	TEST COMMITTION		RESERTING PRESSURE (PSIO)			
II.a. Oper- ation at room temperature (700g)	6525 6500 5460 6500	6400 6325 6390 6340	H.d. Operation at 007.	Valve dexcessing 3000 P.	lvely at			
(10-2)	6430 6450	6350 6350	Valve was reset	to crack	at 6600			
	6150 6150 6150 5150	6350 6360 6350 6350	II.e. Operation at room temperature (75°P)	6510 6600 6580 6570	5530 6530 6520 6530			
II.b. Oper- attion at 150°?.	6300 6210 6180 6180 6180 6180	6080 (680 . 6050 6050 6050 6050		6570 6590 6670 6610 6610 6580	6550 6600 6590 6550 6510 6500			
	6180 6169 6190	6020 6050 6030	II.f. Operation at 0 7.	6030 6000 6200	5950 5950 5950			
II.c. Operation at room temperature (70°7)	5310 6300 6320 5320	6050 6680 6090 <b>606</b> 0	Hig. Oper- ation at 17°F.	6560 6610 6600 6600	65 <b>30</b> 64,90 6500 6500			
	6320 6050 6320 6050 6320 5100 6320 6110 6320 6120			the poppet, seat; installed in this				



10 th 450 9162

PLOID MECHANICS, 6500 PSIG RELIES THEVE

PART NO. 44-19-8-SP; SERIAL NO. 497

II. TEMPERATURE TEST RESULTS (CONTINUED)

TEST COMETTION  II.h. Operation at room temperature (70°7)		ESSECTION PRESSURE (PSIG) 6450 6450 6410 6420 6410 6400 6700 5750 5850			PRESSURE (PS19) 64.00 64.00 64.00 64.00 64.00	
II.i. Operation at hop. (Valve temperature was maintained constant at hop).	6150 6290 6220 6210 6210	5900 6000 6010 6010 6010 6000 6000 6050 5900 5900	II.s. Operation at 160°s.	6180 6180 6180 6300 6180 6180 6110 6110 6300 6100	6150 6150 6150 6150 6090 6090	
II.j. Operation at room temperature (70°F).  II.k. Operation at 150°F.	6220 6180 6150 6150* 6190 6000 6000 5780 5960	5900 5900 5890 5820 5860 5660 5600	II.m. Operation at room temperature (70°P).		6150 6120 6130 6150 6050	
A new inner val- again installed The seal materia	5960 6150* 5950 5900 5900 5880 ve assemblin this	from 5140 to 6190 PSIO and reseating presenting presenting presenting presenting presenting presenting presenting presenting presenting presents at pressures				re .

PART NO. Liberg-8-SP, SERIAL NO. 497

III. CYCLE TEST - 50 CYCLES

CHICKING	MERATING	CRACKING.	KESEATING	
PRESSURE	Pressure	PRESSURE	PRESSURE	
(PSIO)	(PSIG)	(PSIII)	(PSIG)	
6180	6090	6190	6090	
5180	6090	5190	6090	
6200	6100	6190	6090	
6190	6100	6190	6090	
6180	6090	(180	6000	
6180	6090	6180	6090	
6180	6090	6180	6090	
6180	6100	6190	6090	
6160	6090	6170	6090	
6190	61.00	6190	6020	
6180	6090	6180	6090	
6180	6090	6180	6090	
6190	. 5090	6190	6090	
6180	6090	6180	6090	
6190	6090	61,90	6090	
6180	6090	6190	6090	
6190	6090	6180	6090	
6280	6090	6180	6090	
6180_	6090	6190	6090	
6250 <sup>**</sup>		6190	6090	
6190	6090	6180	60%	
6180	6090	6180	6090	
6180	6090	£180	5090	
6180	6090	6190	6090	
6 <b>190</b>	6090	6180	6090	

The second and the second 
#### PLUID MECHANICS, 6500 PSIG RELIEF VALVA PART NO. 44-TO-8-SP, SERIAL NO. 497

#### IV TEMPERATURE TEST RESULTS

THE CONDITION	CRACKING PRESSURE (PSIF')	PRESSURE (PSIG)					
Valve was reset to crack at 6	ioo psig.	, . ,					
(V.a. Operation at mosa temperature (700F)	6525 6490 6500 6510 6510	6480 6460 6400 6420 6450					
IV.b. Operation at C <sup>o</sup> F.	6500 6490 6690* 6800* 6800* 6400	6150 6300 6230 6100 6180 6200					
Valve leaked slightly above 3000 PSIO. Leakage at 5000 PSIO after reseat was greater.							
IV.s. Operation at 160°F.	6380 6380 6380 6370 6360 6400** 6320 6310 6310	6350 6330 6310 6310 6310  6280 6260 6260					

LOCKHEED AIRCRAFT CORPORATION

REPORT LMSD/909010

#### PLUID MECHANICS, 6500 PSIG HELIEF VALVE PART NO. 44-TG-8-SP, SEMIAL NO. 497

CRACKING PRESSURE (polg)	PRESENTING PRESSING (paig)	PRESSURE (psig)	RESEATING FRESSURE (prig)	CRACKING PRESSURE (pulg)	RESEATING PRESSURE (peig)	CRACKING PRESSURE (paig)	RESEATING PRESSURE (paig)
6360 6360 6360 6360 6360 6360 6360 6360	6220 6220 6220 6220 6220 6220 6220 6220	8100 8100 8100 8100 8100	6220 6220 6220 6220 6220 6220 6220				

#### W. H. LADENIG CO., 3200 PSIT EFFIXED VALVE

PART NO. 1548, SERIAL NO. 859, 059 and 059

#### I. INSPICTING RESULTS

Varual inspection of this valve revealed no evidence of damage, defects, or contaminants.

#### II. TEMPERATURE TEST RESULTS

TEDE CONDITION	CRACKING	RESEATING PRESSURE (PS10)	TEST CONDITION	1	PRESSURE (PSIO)
I.a. Room temperature cparation (70°F)	3120 3150 3150 3150 3150 3150 3150 3150	3050 3050 3080 3080 3080 3100 3100 3100	Another valve (: was received and indicated below I.d. Room temperature operation (70°F)	d tested a	
I.b. Opera- tion at 200°F. (Valve was heated to 200°F iq a temperature chamber and then removed and test ed immediately).	2720 2720 2720 2710 2710 2710 2700 2740	2500 2500 2490 2490 2500 2500 2490 2500	I.e. Operation at OOY.	3010 3010 2980 2980 This va at pres excess 510.	2980 2830 2910 2910 1ve lanke sures in of 2300
I.c. Room temperature operation	excess bress/11	of [	I.f. Room temperature operation (70°F). I.g. Oper-	3090 3030 3030 2980	2910 2910 2910 2910
(70°P) This valve (Seri returned to the repeir.	manufactu	9 was irer for	160 r.	2950 3000 3030 3030 3040	2950 2950 2950 2960 2960
A new valve (Serial No C59) was received and it cracked at approximately 3100 PSIO but did not reseat bubble tight until the pressure dropped to approximately 2000 PSIO. This valve was, also, returned to the manufacturer.		I.h. Room temperature	3020 3040 3010 3010 Valve 1 all pre	2910 2910 2850 2850 eaked at	
Colonia Commissione de Britannia de Britannia de Proposito de Proposito de Proposito de Proposito de Proposito			operation (70°F) Testim was disc was returned to	in exce 50 PSIO	ss of and valve

REPORT IMSD/909010

#### VACCO VALVE CO., 3200 PSIG RELIEF VALVE

PART NO. RV90-LP-LO3

#### I. INSPECTION RESULTS

Visual inspection of this valve revealed no evidence of damage, defects or contaminants.

II. TEMPERATURE TEST RESULTS

TEST CONDITION	CRACKING PRESSURE (PSIG)	PULL OPEN PRESSURE (FSIG)	PRESSURE (PCIG)
II.a. Operation at room temperature	3030 3035	<b></b>	2870 2820
(70°F).	3000 2800 2950	3375 3100 3000	24 <b>80</b> 25 <b>10</b> 23 <b>00</b>
	2500 2350 2350	2500 2580 2600	2350 2030 2050
•	2500 , 2300	2550 2550 2550	1950 2100

Testing was discontinued and the valve was returned to the manufacturer. No further testing was scheduled for this valve because of the large amount of unsatisfactory data obtained during previous acceptance tests (100% rejection).

The primary problem with this valve was the large change in cracking pressure which was eaused by the extrusion of the nylon seat of the pilot valve. Also, the valves were heavily rusted internally, which was apparently caused by the use of distilled water for proof testing and iradequate removal of the trapped water.

VIESON MANUFACTURING CO., 3200 PSIG RULLER VALVE

PART NO. 4-ROOMO, SERVAL NO. 1003

#### I. INSPECTION RESULTS

Visual inspection of this valve revealed no evidence of damage g defects, or contaminants.

#### II. TEMPERATURE PAST RESULTS

		<del></del>		<del>,</del>	<del>,</del>
	CRACKING	HESEL FIRM	Í	CRACKING	#374?1K
TEST CONDITION	PRESSUEE	PRESSURE	TEST CONDITION	PRESSURE	
	(1810)	(PSID)		(BD)	(PSPS)
II. a. Opera-	3336		H.d. Opera-	3210	3070
tion at room	3300	3230	tion at room	3220	3070
temperature	3300	3200	temperature	3220	3030
(80°F)	3310	3200	(70°F)	3210	3000
(50.07)	3300	3200	1	3210	3600
	3320	321:0		3210	3000
	3320	3180		3230	3000
	3310	3160		3210	3010
	333C	3110	, ·	3200	3000
	3310	3120	-	3200	1060
Illaba Opers-	3250	3200	II.e. Opera-		
tion at 160°7	3250	3210	tion at 160°F	3140	<b>3</b> 000
STOR WE NOU!	3260	3200	200 2	3150	3070
	3260	31.70		3220	3010
	3260	3110		300	3010
	7200	3240		3110	3020
II.d. Opera-	Crackin	g pressure		3140	3020
tion at room	Was apr			3140	1020
temperature		2900 PS10		3140	2050
(70 <sup>6</sup> )	but the	•		314c	3020
•	lesked	down to		3110	3020
	2000 PS	IO after			
	orackin	¥• '	II.f. Opera-	2150	2950
nerit mendaperadente de la companya			tion at room	314:0	2950
The valve mas d	-		tempereture	3250	2950
the conical pop			(70°F).	3140	3910
by a hemispheri				3340	2910
face) poppet.				3140	2900
(Keley) was ext				3340	290
the conteal pop		nohing		3240	2900
metal to satal.	)	? \$		3140	2900
	warenest of the transport of the teachers			3110	2900

#### VINSON MANUFACTURING CO., 3200 PSIG RELIEF VALVE

PART NO. A-800LO, SERIAL NO. 1003

#### II. TEMPERATURE TEST RESULTS (CONTINUED)

TEST CONDITION		PRESSURE (PSIG)	TEST COMPLITION	1	PRESSURE (PSIG)
	3140 3140 3140 3140 3140 3140 3150 3150 3140	2850 2890 2360 — — — 2890 — 2890	II.j. Operation at room temperature (70°F).	3290 3290 3300 3300 3300 3300 3300 3300	3250 3260 3270 3260 3270 3260 3250 3260 3260 3260
The valve was revender for modification (Kel-F)	Mication a		II.k. Opera-	3150 3240 3250 3240	3100 3200 3100 3110
II.h. Opera- tion at room temperature (7007)	3230 3250 3250 3250 3250 3250 3250 3250	2980 3220 3250 3220 3170 3180 3150 3150 3150		3240 3240 3230 3230 3240 3250	3110 3100 3100 3100 3070 3100
II.i. Operation at 160 T.	3210 3210 3210 3210 3210 3210 3200 3210 3200	3170 3150 3060 3030 3020 3050 3010 3010 3020			

## THE THE HAMUTACHURURO CO., JOHO PAIR RELIGIT VALVE. PAIRT DO. 1-80010, SERIAL DO. 1001

r e		rada de la	•	•	** e:		
: CiviCivi		REACE IN	RESEATING	CRACKING.	RESEATING	F CRACE INO	EESLATIVA
			PRESSURE	PRESSURE	PRESSURE	PRESSURE	PRESSURE
(pein)	(5=25)	(pelg)	(peig)	(psig)	(psig)	(pxi4)	(paig)
		3290	33.00	3290	3100	3300	3350
1200	300	3250	33.00	3290	3090	3300	33.00
9290	37160	3290	3080	3320	3100	3250	1100
		<b>329</b> 0	2600	מודכנ	3100	3250	5000
300	3600	3290	3200	3310	31.00	3290	3090
3250	3210	3290	3100	3300	33.00	3290	3300
3250	210	3290	3090	3300	3200	3890	3200
3290	321.0	3280	3080	3300	31.00	3290	3000
<b>329</b> 0	3260	3290	3100	3300	33.00	3250	3760
3290	32 <b>110</b>	\$ 3275	31.00	3330	3120	3250	33.00
290	3240	3290	nio	3300	3110	3300	מנונ
270	321:0	3290	3130	3300	3170	3260	327.0
3200	3870	3290	3100	3300	2270	3280	3210 3225
3300	3089	3290	33.00	3300	3110	3300	1150
3300	200	3250	33.00	3300	3010	3300	3150
3300	MAS.	3290	31.00	3290	3100	3300 3300	3150
321.0	3075	3290	33.00	3300	31.00	3300	ns
3710	NW.	3260	3090	3300 3300	3100	3300	nes
3300	30.00	3290	3110	3300	33.00	3300	3225
3270	3000	3290	33.00		3300	3300	7230
3250	31.70	3290	31.00	3300 3300	33.00	3300	nio
3370	3200	3290	3100	3300	70.00	3300	nes
3250	71.60	3290	30.00 30.00	3300	33.00	3300	3220
3260	33,500	3290	3100	3300	3100	3320	3225
3260	3090	3290	31.00	3290	33.00	3300	325
3290	3080	3290	31.00	3290	3300	3300	3125
3275	300	3290 3290	3000	3300	33.00	3300	3125
3280	32.00	3280	3080	3300	3200	3300	129C
3297	3080 3200	3290	TIM	2300	3200	3300	Jits
3280	3100	3290	30.00	3300	30.00	3300	32.00
3280	3000	3290	33.00	3300	30.00	3300	3000
3280	3070	3290	31.00	3300	33.00	3300	33.00
3260	32.00	3290	31.00	3300	31.00	3300	33.00 ·
3050	3080	3270	30.00	3300	30.00	3300	3100
5270	:030	3290	33,00	3300	32.00	3300	3100 3100 3100 3100 3800
3270	3.00	3290	32.00	3300	32.00	3300	33.00
3275	3770	3290	32.00	3300	33.00	3300	3100
3275	<b>3.00</b>	3290	32.00	3300	3200	3290	3500
3260	3050	3250	37.00	3300	3000	3290	1150 1150
3290	3170	3290	31.00	3300	3200	3290	220
3300	JL CO	3250	33.00	3300	323.0	3290	3300
3290	alo	3290	3000	3300	3800	3290	
3290	nic	3290	33.00	3300	3150	3290	3110 3150 3150 3140 3140 3140 3140
3290	2770	3290	3000	3300	3175 3100	3290 3290	- AIA
3290	nro	3290	3090 31.00	3300 3300	31.20	3290	TILLO
3290 3280	37.00	3300	37.00	3300	37.00	3290	Dio
3250	3200	3300 3300	3100	3300	3200	-3290	Plo
3200	3090 3100	3300	31.00	3290	3200	3290	37.0
1.35 <b>7</b> V		1 2200		1			,

# VINSON MARUFACTURING CO., 3200 POIG RELIEF VALVE, FART BO. 4-80040, SEMIAL BO. 1003

		<b>n</b> i.	. CYCLE TES	T RESULTS	• •		
GRACK MO	E-SEATING	CALCATE	RESEATING	CALCAING	RESEATING	CHACKING	RESEATIFO
Press, Re	Passons	PRESSURE	PRESSURE	PRESSURE	Parcour	PRESSURE	PRESSURE
(Fois)	(polg)	(paig)	(peig)	(Felg)	(peig)	(psig)	(pata)
3270	MOD	3300	31.00	3300	3230	3300	3110
1290	33.00	3300	30.00	T AAAW	3110	3300	3120
2074	31.00	3300	3100	763	3010	3300	3110
3270	3100	3300	33.00	325	סנונ	3300	3110
3270	3000	3300	3120	3365	3110	3300	3110
3300	3130	3300	31.20	3335	3330	3300	3110
3390	32.20	3300	33.20	3325	3330	3300	3110
3260	3210	<b>3300</b>	3120	3335	3110	3310	ग्रञ्
3250	3200	3300	30.20	3325	3330	3300	nz
3280	33.83	3300	3020	325	2070	3300	3120
3590	3350	3300	3350	2335	3110	3300 3290	3090
3290 3300	3280	3300 3300	3200 3250	3315 3315	3110 3110	3290	3090 31.00
3290	3270	3300	3225	3335	סנונ	3290	3100
3290	3340	3300	3200	3935	3330	3290	3100
3290	3250	3300	3200	3305	3110	3290	30.00
3270	3240	3300	33.50	ins	3110	3290	3080
3290	3240	3325	3140	3335	3330	3300	30.00
3290	3240	3310	3125	3335	3110	3330	3100
3290	3210	3300	3125	3335	3110	3310	31.00
3290	3930	3290	3110	3335	31.20	3300	31.00
3300	31.25	3290	32.00	3325	3115	3310	32.00
3300	31.25	3290	31.00	3315	3115	3300	3100
3300	J125	3290	32.00	3335	3115	3300	31.00
3300	Nes	3290	3100	3335	3115	3300	33.00
3300	3223	3290	33.00	3335	<b>3125</b>	3300	3100
3290	31.00	3290	31.00	3335	3115	3300	3100
3500	3090	3300	220	كتارة	3115	3310	270
SETO	300	3300	3000	3305	2720	3320	1115
3250	3100 7120	3300	3000	3300	3100	3330	3110
3290	3320	3290	ny	3300	3110	3310 3310	
3300 3300	7110	3290	31.25 21.50	3300	3110	3330	3110
3300	3110 3150 3150	3290 3300	120 120 120 120 120 120 120 120 120 120	3300 3300 3300 3300 3300 3300 3300 330	110 110 110 110 110 110 110 110 110	3330 3330 3330 3330 3330 3330 3330 333	3125 3125
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3300	nio	3300 3300 3300 3300	1125	3300	7770	3310	1125
3300 3300	منت	3300	3125	3300	3110	3330	33.25
3300	3110	3300	3125	3300	3330	3330	3125
3300	<b>1110</b>	J 3300	3125	3300	33.10	3330	3125
3300	3210	3300	30.25	3300	3110	3330	31.20
3300 3300 3300 3300 3300	3110 3110 3110 3110 3100	1300	32.25	3300	30.15	3330	33.20
3300	3200	3300	3370	3325	3320	3330	31.20
المحرو	五75	3300	200	3325	3110	3330	3120
3300	777		33.00	3320	72.75	3300	3130
3300	3200 3275 3275 3275 3275 3275	3300 3300 3300 3300 3300	3100	שענ	312U	3300	3130 3130
3300	3475 4110	1200	2000 2000	3300	3130 3100	1310	7.50 7.50
3300 3300	7110 7110	3300	2000	1200	37.10	3100	1130 1130
3300	711A	1300	7000	1900	2010	1810	11 % I
1900	1110	3300	31.00 2000	3300	33%	3336	<b>35</b>

SERCHAFY CONFINATION

VERDOU MENUFACTURING CO., 1000 PEIG ARLUEF VALVE, PART NO. 2-COLO, SEMIAL NO. 1009

the second process of the second of the second					· · · · · · · · · · · · · · · · · · ·	Salar conductive descriptions of the salar sections of the salar s
	CARCAL ED	HESEATING	CRACKING	ALSEATING	CEACXING	ALCEATIFO
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	3300	3100		1		
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	1124	2000	1	•		
	1700	7000	1		,	
	1310	325		i		
ÎŎ	33.00	SILO				
	210 210 210 210 210 210 210 210 210 210					

#### VINSON MARUPACTURING CO., 3200 PSIJ RELIEF VALVE

PART NO. A-90157-1, SERIAL NO. 1001

#### I. INSPECTION RESULTS

Visual inspection of this valve revealed no evidence of damage, defects, or contaminants.

#### II. TEMPERATURE TEST RESULTS

AND SERVICE CONTROL OF THE CONTROL O	D IONI MOUNTO	
TEST COMPLITION	CRACKING PRESSURE (FSIG)	RESEATING PRESSURE (PSIG)
I.a. Operation at room temperature (70°F).	3230 3240 3240 3240 3240 3240 3240 3240	3150 3220 3080 3060 3060 3060 3210 3050 3020
I.b. Operation at OoF.	Valve leak at 2100 PS	ced excessively
I.c. Operation at room temperature (75°F).	3200 3210	3000 3000
I.d. Operation at 160°7.	3030 2800 2830 2820 2820	2600 2650 2750 2690 2700

# VINCON MANUFACTURING CO., 3200 PCIN HEAREF VALVE FART NC. A-90157-1, SERIAL NO. 1001

III. CYCLE 1 .. I RESULT - 50 CYCLE

GEACKING	RESEATED	CRACKING	PRESENTIAU
PERSOURE	PRESSURE	PRESSURF	PRESEURE
(PSIO)	(PSIG)	(PSID)	(PSIG)
3230 3230 3230 3220 3220 3220 3220 3210 321	3000 3030 3130 2950 2950 2950 2950 2930 2930 2930 2930 2930 2930 2930 293	3220 3210 3210 3210 3210 3210 3220 3210 3210 3210 3220 3210 3210 3210 3210 3210 3210 3210 3210 3210 3210 3210 3210 3210	2930 2930 2940 2940 2940 2940 2940 2940 2940 294

### VINSON MANUFACTURING CO., 3200 FOIF HELLIFF VALVE

PART NO. A-90157-1, SERIAL NO. 1001

#### IV. TEMPERATURE TEST RESULTS

	IV. TEMPEKATURE	TEST RESULTS	
	TEST COIDITION	Crackino Pressure (PSIG)	RESEATING PRESSURE (PSIG)
IV.A.	Operation at 8°F.	Valve lea nt 2000 F	ked excessivel SIG.
TV b	Operation at 160°F.	3050 2860 2750 2800 2700 2780 2800 2940	2650 2550 2530 2520 2510 2520 2520 2750
•	Valve was returned to the reworked. The following at Vinson Mamufacturing Ca representative from Local Control of the Control	tests were perfo. and witnesse	ormed d by
IV.c.	Operation at room rature (70°F).	3260 3250 3220	3150 3200 3160
IV.d.	Operation at 160°F.	3100 3150 3110	3050 3050 3050
IV.c.	Operation at O°F.	3300 3250 3250	3200 3100 3100

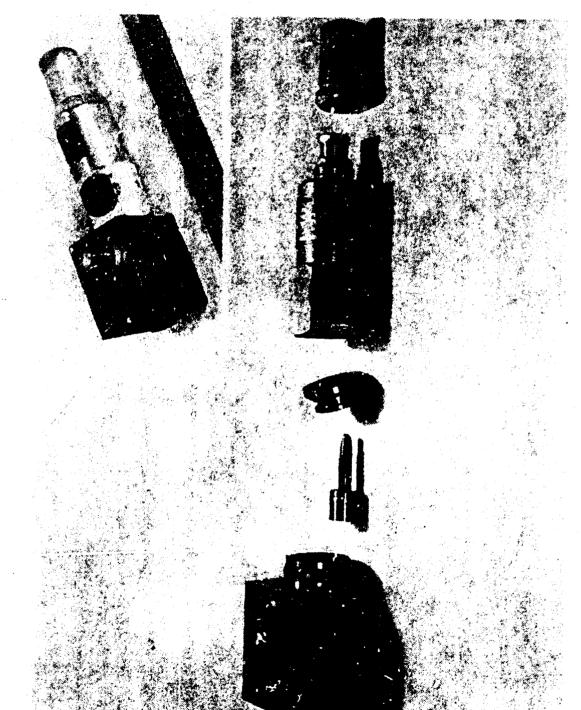
### VIESON MINUFAUTURING CO., 6500 PSI RELIEF VALVE PART NO. A-90157-2, SERIAL NO. 1002

#### I. INSPICTION RESULTS

Visual inspection of this valve revealed no evidence of damage, defects, or contaminants.

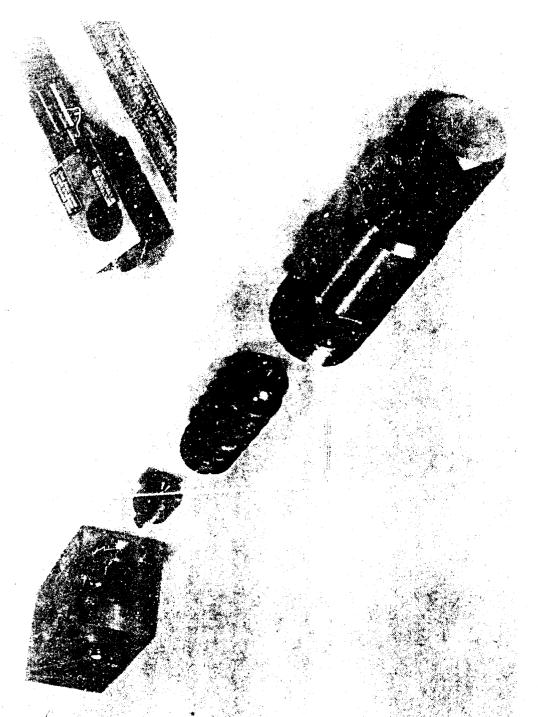
II. TEMPERATURE	test besults	
	CRACILING	RESERVE
TEST CONDITION	PRESSURE	PRESSURE
·	(PSII)	(PSIG)
II.3. Operation at room	6250	
temperature (70°7).	6220	5720
•	<b>5160</b>	5750
	5000	5700
	5000	5710
	62 <b>00</b> ⁵	5680
	5920	5680
	5920	5670
	6000	5590
	5830	3590
-	6050	5590
II.b. Operation at 150°F.	Valve oper	ated erraticall
	with craci	ing pressure of
	ammatini	ely 5000 PSIG
		ely 5000 PSIG Las pressure of
	secer bus	
II.e. Speration at ross	secer bus	ing pressure of all four soll.
H.c. Operation at ross	and researched	sian preesure of sely 4700 page.
H.c. Operation at ross temperature (79%).	\$600	ing pressure of all four soll.
	and researched	5500 5700 5700 5700 5700
	and researched approximate 5500 5500	sing pressure of ely 4700 FSE. 5500 5700

Falry was returned to manufacturer.



ANDHALON DRFELLOOD RELIEF VALVE - TYPE 3JS46 (V27102)

FIGURE 1. ANDE



Pround 2.

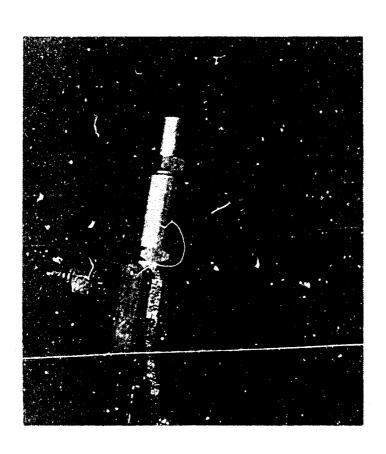
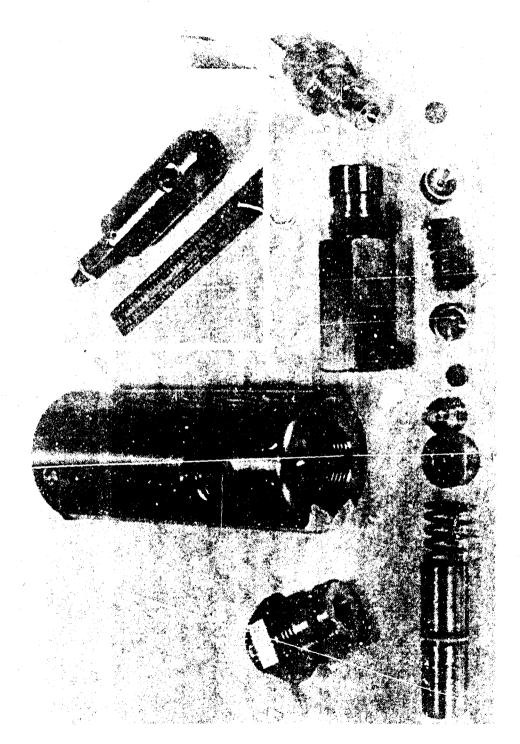
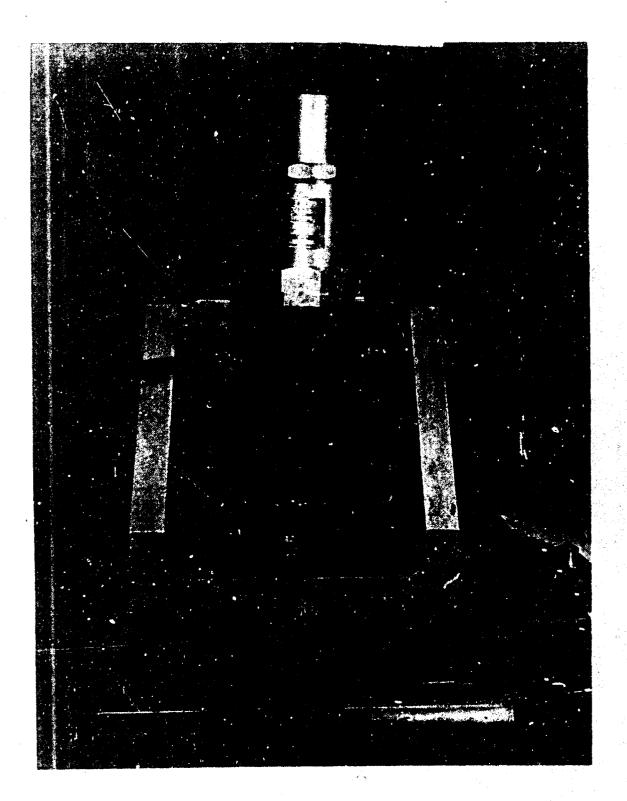


FIGURE 3. LADENIO RELIEF VALVE - TYPE 154 S (V35153)



PICOPE L. TACCO RELIEF VALVE - TYPE RUSO-LP-LO3 (V2(C)2)

FIGURE 5. VINSON RELIEF VALVE - TYPE A-80040 (109713)



of the popper and spring.

ANDERSON GREENWOOD 3200 PSIG RELIEF VALVE. (V27229)



TEST INSTALLATION FOR VIBRATION PERPENDICULAR TO THE AXIS OF THE POPPET AND SPRING. (V27230) ANDERSON GREENWOOD 3200 PSIG RELIEF VALVE

FIGURE 7.

CITARGUARD TRANSPORTER

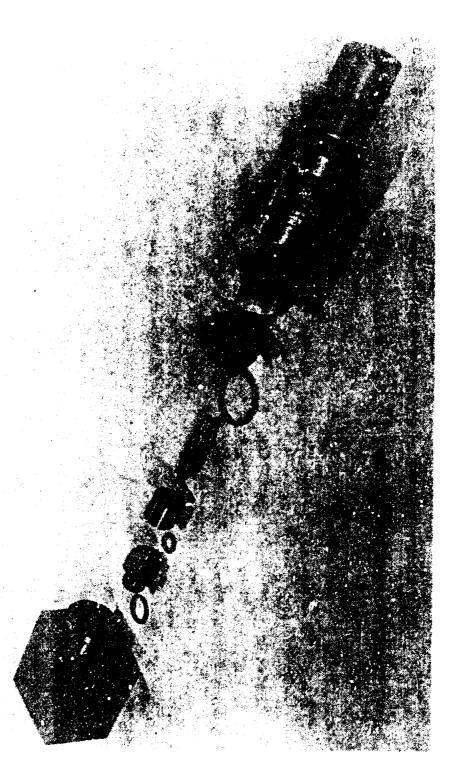
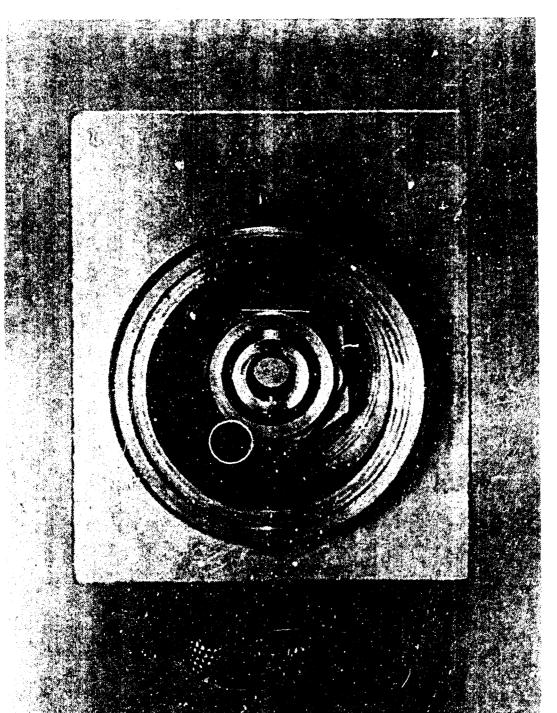


FIGURE 8. ANDERSON GREENWOOD 3200 PSIG RELIEF
DISASSEMBLED AFTER COMPLETION OF TESTING (V27876)



INTERIOR VIEW OF ANDERSON GREENWOOD 3200 PSIG RELIEF VALVE SHOWING PARTIALLY EXTRUDED NOZZLE SEAL (V27311) FIGURE 9.

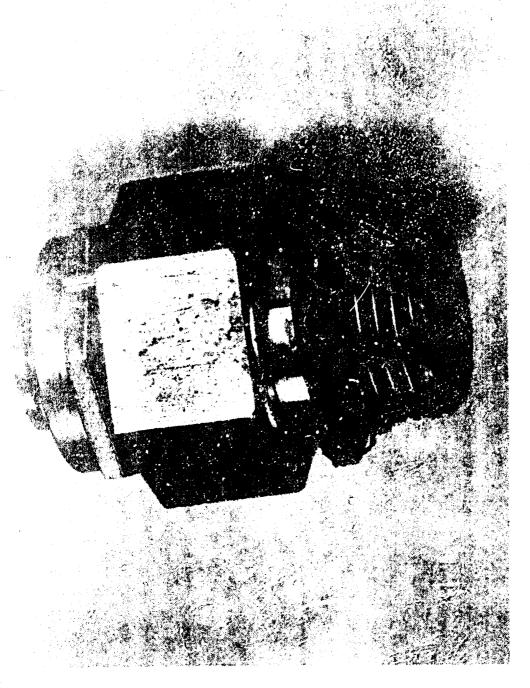
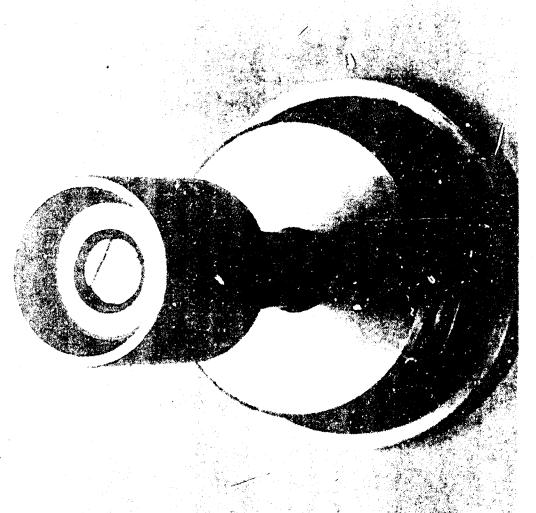


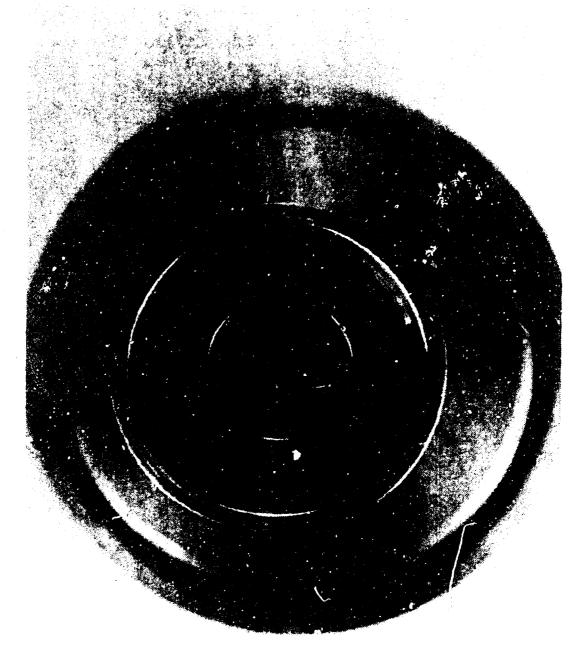
FIGURE 10. DAMAGED NOZZLZ SEAL REMOVED FROM
ANDERSON OREZINGOD 3200 PSIQ RELIEW 941VE (907312)



FIGURE 11. DAMAGED NOZZLR SEAL REMOVED FROM ANDERSON GREENWOOD 6500 PSIG RELIEF VALVE (V2723)



NIGURE 12. POPPET AND GUIDE FROM ANDERSON GEGENWOOD 6500 PSIG RELIEF VALVE (27104)



CLOSEUF OF POPPET SEAL FRACTURE (VITON-A C-KING) IN ANDERSON GREENWOOD 6500 POIG RELIEF VAIVE FIGURE 13.

(V26302)